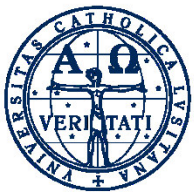

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Does "The Lean Startup" increase startups' chances of success in Lisbon? Introduction to a "Leanness" scale.

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ABSTRACT [ENG]

When following "The Lean Startup" (TLS) methodology, described by Eric Ries, startups are expected to have higher chances of success than conventional startups. The following study is the first attempt to empirically assess TLS approach macroscopic impact on startups' death rates in the Lisbon's ecosystem. A survey with validated "leanness" measuring scale, was used to classify startups. A local startup database, built using mainly online resources, diffused the survey through out Lisbon's established startups. In addition, several semi-structured interviews were held with local entrepreneurship experts to complement quantitative findings. Lisbon's "Lean" startups' death rates were compared against "non-Lean" startups. No meaningful correlation between TLS usage and lower startups' death rates were found. Additionally, studying TLS methodology adoption rates in Lisbon was not possible due to sample size limitations. Furthermore, no connection between increased investor's confidence towards "Lean" investment opportunities was qualitatively found, neither have experts stood behind standardized metrics to monitor startups' progress. Startups' information is scattered and outdated, rendering research challenging and time-consuming. Startups struggle to standout from small businesses also riding the entrepreneurial hype, forming a foggy entrepreneurial hotspot. A startup certification process would be invaluable to highlight, accurately entitle fiscal benefits, increase investors' exposure and monitor real startups' progress. The developed "Leanness" scale could also be used to measure how much startups actually follow TLS methodology. Further groundwork is still needed to set the first research foundations on the subject in Lisbon.

Key-Words: The Lean Startup, Lean Entrepreneurship, Startups' Success and Death Rates, "Leanness" Scale, Lisbon's Startup Ecosystem, Entrepreneurs' Motivation and Resilience.

ABSTRACT [PT]

Seguindo a metodologia "The Lean Startup" (TLS), descrita por Eric Ries, espera-se que as startups tenham maior sucesso que startups tradicionais. Este estudo classifica-se como uma primeira tentativa de avaliar empiricamente o impacto macroscópico da metodologia TLS nas taxas de mortalidade de startups no ecossistema de Lisboa. Construiu-se uma base de dados de startups em Lisboa e, posteriormente, difundiu-se o primeiro questionário com uma escala de "Leanness" para estudá-las. Adicionalmente, foram conduzidas entrevistas semiestruturadas com empreendedores especialistas para enriquecer a pesquisa quantitativa. Não foi encontrada uma correlação significativa entre o uso da abordagem TLS e a redução das taxas de mortalidade de startups. Devido à falta de informação, não foi possível perceber qual é o grau de adoção da metodologia TLS. Não foi encontrada uma razão que justifique a maior confiança de investidores relativamente a oportunidades de investimento em startups que usam os princípios TLS. Especialistas em empreendedorismo não chegaram a um consenso no que diz respeito a um conjunto de métricas para monitorizar o progresso de startups. A sua informação no ecossistema de Lisboa encontra-se dispersa e desatualizada, o que tornou o estudo demorado e complexo. As startups esforçam-se por se destacarem dos pequenos negócios que se alimentam do alvoroço em redor do empreendedorismo, transformando Lisboa num polo saturado e confuso. Ainda há muito por descobrir neste ecossistema e, futuramente, os processos de certificação de startups e identificação de startups que utilizam os princípios TLS a partir da escala "Leanness" seriam caminhos a explorar.

Palavras-Chave: The Lean Startup, Lean Entrepreneurship, Taxa de Sucesso e Mortalidade de Startups, Escala "Leanness", Ecossistema de Empreendedorismo de Lisboa, Motivação e Resiliência no Empreendedorismo.

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LIST OF ABBREVIATION

BML- Build-Measure-Learn
CAC- Customer Acquisition Costs
CLTV- Customer Life Time Value
ENG- English
KPI- Key Performance Indicator
LS- Lean Startup
MVP- Minimal Viable Product
NLS- Non-Lean Startup
PT- Portuguese
TLS- The Lean Startup

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INTRODUCTION

The startup environment is an undeniable battlefield. Co-founders join forces to overcome obstacles and triumph over markets by successfully capturing value from customers through sustainable and profitable businesses. Successful exploitation entrepreneurial opportunities require translating that opportunity into a viable business model (Amit & Zott, 2001). However, for many ventures, this is not straightforward given considerable uncertainty levels they are subjected to, both in terms of technical and market feasibility (Anderson & Tushman, 1990).

However, war is dangerous and an unpredictable game. In fact, unexpected variables and opportunities can quickly change the aftermath's outcome. The market is as fickle as it is unpredictable (Sahlman,1997). Hence, the need for business methodologies. They are to entrepreneurs as similar as chess boards were to military Generals. They become a testing ground where entrepreneurs can methodically experiment on new business approaches, with little consequences, and foreseeing potential drawbacks.

Afuah defines business models not only as activities ventures engage with, but also how, when, and how much resources are used to undergo those activities in order to deliver superior customer value, and also capture value as profits (Afuah, 2013).

Furthermore, business models have been described as a particular set of integrated choices limited to a new venture's unique customer value proposition, and how it will manage activities to deliver value, and earn sustainable profits (Eisenmann, Ries, & Dillard, 2012). Additionally, business models have also been portrayed as a building plan, allowing the designing and realising of the business structure and systems that will constitute the startup's operational and consequently physical form (Osterwalder, Pigneur & Tucci, 2005).

Moreover, such as in warfare, in business one can observe his opponents chosen tactics, and react to it, but it is from the concealed strategy that victory evolves (Tzu, S., 5th century BC). Thus, the business model's implementation and execution are inevitably key to its success. In fact, the way a business model is carried forward outweighs generally its quality. Nevertheless, business planning's importance also known as strategic planning is widely neglected by entrepreneurs (Osterwalder et al., 2005).

Since new businesses arise from turbulent environments where planning is an unaffordable reality, where opportunities are time-sensitive and where failure isn't generally financially painful, business

models are often forgotten by entrepreneurs (Bhide, 1999). Additionally, because entrepreneurs rely almost exclusively upon their intuition sharpened by experience (Dane & Pratt, 2007) and business planning often does not lead to entrepreneurial success but rather entrepreneurial success leads to business planning (Mazzarol, 2001), the business plans utility has been questioned and not proven to significantly increase new ventures' success (Perry, 2001). Finally, Lange et al. (2007) looked at 116 new ventures born between 1985 and 2003 in an effort to assess whether writing a formal business plan before launch, affected subsequent performance. The authors found that unless there is a compelling reason to write one, as a funding purposes, having a business plan to layout the business model, isn't necessary.

Nevertheless, given the current pace at which business models are taking advantage of new technologies and even transforming whole industries, a methodical and practical mechanism such as the business canvas model (Osterwalder, Pigneur, Smith & Movement, 2010) becomes a powerful tool. Indeed, by experimenting with specific business models and incorporating feedback from the environment, entrepreneurial ventures adopt an active stance to learning about the environment (Andries, Debackere & Looy, 2013). Frequently, the Business Model Canvas not only causes entrepreneurs to constantly rethink their business structure but also provides a holistic perspective of business' articulation. This graphical and visual component, causes business creativity and innovation to increase and highlights possible risks and business opportunities. Furthermore, the Business Model Canvas also promotes superior communication across stakeholders (Trimi, & Berbegal-Mirabent, 2012).

Traditionally, driven by the urge to furiously penetrate the market as fast as possible with their idea, entrepreneurs generally write business models, devise business plans, present them to investors, gather co-founding teams, develop products and engage in fierce selling (Blank, 2013). Instead, if business models could be perceived not only as fictional plans or as means to an end, but rather as a managerial equivalent of the scientific method where a hypothesis set has to be tested in action and revised when necessary (Magretta, 2002), then, business models could represent a realistic approach for entrepreneurs to implement, even if at a slower pace, their validated ideas.

Hence, a new methodology that favours iterative design over forthright vision, experimentation over detailed planning and customer inputs over intuition, emerges to overthrow conventional business planning (Blank, 2013). The TLS movement is a new attitude to address entrepreneurship. It evaluates startups' entire business models seeking concrete validation of underlying assumptions, which are subjected to continuous and rigorous testing (Eisenmann et al., 2012). The TLS concept balances the

Just do It, Waterfall Planning and Build and They Will Come approaches, combining strong direction coming from founders' vision with strategic thoughtful planning. It also unveils the possibility to change course on the go, as consequence of the business model's hypothesis testing (Eisenmann et al., 2012). It is vision that guides entrepreneurs to their destination but its strategy steers the way a desirable product is delivered to customers. TLS is a methodological process that uses validated learning to layout strategy, but also to eliminate wasteful operations, leading to a faster product development cycles. This process follows an incremental innovative path, through which customer inputs are essential and where every setback can be turned into an opportunity for improvement (Ries, 2011). According to Frederiksen and co-authors (2017), the following elements sum up the main tools and general philosophy of TLS movement: user and customer involvement in product and business development (customer development methodology); an iterative approach to new product development (build-measure-learn feedback loop) ; experimentation in product development (validated learning), the minimum viable product (MVP) and entrepreneurial thinking (collection of meaningful through actionable metrics).

However, TLS has its limitations, for example when demand uncertainty is so low that the unmet desire for a product shadows the need for customers' feedback (example: a solution to solve the worlds energy crisis), when the tolerance for mistakes is limited either by law, by the difficulty to correct follow-up errors, by the possibility that errors could lead to customer dissatisfaction or even when mistakes are socially unacceptable (untested pharmaceutical drugs for instance). But also when product development iteration takes to long, the hypothesis-driven approach becomes difficult to implement (Eisenmann et al., 2012).

The movement hasn't gone totally mainstream and its full impact is yet to be measured (Blank, 2013) despite its claimed potential to decrease startups failure (Ries, 2011).

Thus, in this study, the impact of the hypothesis-driven approach on the death rates of Portuguese startups established in Lisbon, will be evaluated and compared to traditional entrepreneurial ventures death rates.

Problem Statement

This study aims to evaluate the impact of "The Lean Startup" entrepreneurial approach on Lisbon established Startups' death rate, in comparison to the conventional entrepreneurship method. It was also intended not only to analyse if this recent movement has any effect on entrepreneurs' motivations when confronted with failure but also on investors' confidence towards investment opportunities on TLS startups.

Research Questions

- What has Lisbon's established startups death rates been in the last 5 years when using TLS methodology?

- What has Lisbon's established startup death rates been in the last 5 years when not using TLS methodology?

- Which are the 1st, 2nd, 3rd (if applicable), 4th (if applicable) and 5th (if applicable) year death rates of Lisbon startups established using TLS methodology?

- Which are the 1st, 2nd, 3rd (if applicable), 4th (if applicable) and 5th (if applicable) year death rates of Lisbon's startups established not using TLS methodology?

- What is the evolution of TLS adoption on Lisbon based accelerators and incubators programs?

- How can a startups' progress be accurately monitored?

- Can Lean entrepreneurship affect entrepreneur's motivation and resilience when confronted with failure?

- Do investors value more startups using TLS approach?

- Can TLS methodology increase startup's probability of success?

Academic and Managerial Relevance

Entrepreneurship is growing in Lisbon. It is not by accident WebSummit was held in Lisbon last two years and it the forthcoming one. Startups incubators, providing acceleration programs, are flourishing in Portugal, seeking to turn new ideas into successful businesses. Lisbon currently counts more than 15 incubators, 20 acceleration programs and a growing business angel community. As Duarte Cordeiro, Lisbon's vice-mayor announced: "Lisbon's startups' ecosystem is very young but appears to be ready for the global growth and gives us the confidence that we are working in the right direction" (Startup Genome Report, 2017). The incubators responsible for this growth have been incorporating TLS entrepreneurial approach to develop new businesses. Therefore, it is imperative to assess as soon as possible the effects of this movement on these startups' success rates and its influence on entrepreneurs' motivations and resilience to thrive in a highly competitive market. This study will try to prove the benefits of TLS methodology both on Lisbon established startups' death rates and also on entrepreneurs' mindset. If the hypothesis that TLS is decreasing startups' failure rates and optimising the entrepreneurs' efforts is verified, then this study would corroborate the efficiency of TLS methodology and explain incubators' convergence towards this approach.

Scope Analysis

This study focuses on TLS methodology impact when applied to startups' business models development throughout out the city of Lisbon. In this thesis, it is expected to not only reach present startups being accelerated in TLS and non-TLS programs in Lisbon but also startups that have already endured them. This study will focus on a macroscopic approach to validate the efficacy of TLS methodology in the Lisbon ecosystem.

LITERATURE REVIEW

Lean Origins

In the 1930s, Taiichi Ohno, Kiichiro Toyoda, and other Toyota members identified the inefficiency in Ford's production system. Henry Ford's assembly line was keen on minimizing the amount of time that elapsed between beginning and completion of production however, this mass production system was unable to deliver product variety: it required sizable inventory to produce high volume batches and it also needed a huge level of vertical integration (Krafcik, 1988). After World War II, the Toyota Production System was further developed in Japan seeking to maximize production efficiency. Adaptability and effectiveness of this system were accomplished by implementing continuous improvement programs, just-in-time inventory management, continuous production flow, quick changeover techniques, systems integration, quality systems, and a pull system. The combination of these practices created synergies resulting on a "streamlined, high-quality system that produces finished products at the pace of customer demand with little or no waste" (Shah & Ward, 2003). Emerging from this system, the lean thinking approach was characterized by Womack and Jones in 2003 with the purpose of implementing the Toyota Production System philosophy into the enterprise environment. Given that value is defined as the amount customers are willing to pay for the service or product a company provides (Porter, 1985), the evolution of this production system resulted in principles companies should follow in order to maximize their performance such as specifying what customers truly perceive as value, identifying which steps of the value stream aren't adding value to the product from the customer's perspective, making value flow from the beginning to end of production, establishing a production pull system and finally, striving for perfection (Womack & Jones, 1996).

In "The Lean Startup" (Ries, 2011), the author goes a step further and adapts Womack and Jones' lean thinking practices to the startup level. Well-known nowadays, TLS is just one among many frameworks designed to help new entrepreneurs conceive new and innovative products (Frederiksen & Brem, 2017). This methodology combines the customer development approach (Blank, 2013) with ideas of agile software development and lean management (Womack & Jones, 2003).

What is a The Lean Startup?

According to Blank (2007), the Customer Development model reduces the risk of new ventures creating products that customers do not actually want. In fact, when ventures progress from vision to product development without consulting with customers in the process, the chances of getting a good product-market fit are slim. The Customer Development method helps new startups structure an early stage process to get to know their markets, to identify their customers and finally, to test their business assumptions through hypothesis validation (Trimi et al., 2012). Nonetheless, entrepreneurs are often eager to start product development driven by their personal vision and are blinded by entrepreneurial bias for action, in the sense that they forget to test their business assumptions through a hypothesis testing process (Cespedes, Eisenmann & Blank, 2012). The Customer Development model consists of four steps: 'Customer Discovery', 'Customer Validation', 'Customer Creation', and 'Company Building' (Blank, 2007). In the Discovery step, founders try to identify a customer group and market segment and validate if the product solves a problem for that same customer segment. The goal of this operation isn't to identify if the founders' vision has a place in the market but instead to identify customer problems in order to test if those same problems cause enough distress to justify the quest for competitive solutions (Blank, 2007). When employing validation methods like minimal landing pages, paper-prototypes, or early working prototypes the feedback from potential customers can be classified as learned validation and be used to secure early "problem-solution" fit (Müller & Thoring, 2012). A central piece of the TLS model is the use of Minimal Viable Products (MVPs). MVPs can be defined as initial versions of the product testing a set of key hypothesis with the minimum amount of effort (Ries, 2011). The TLS approach mainly incorporates these validation tools to turn the build-measure-learn feedback loop (MBL) continuously and in synchronization with the product development (Blank, 2007). The integration of the validated learning acquired through hypothesis testing is coordinated with the agile development methodology in order to maximize the product development process fluidity and efficiency. Also, agile development could be defined as a strategic mechanism to create and respond to change, the ability to find an equilibrium between flexibility and structure, to draw creativity and innovation out of a development team, and empower organizations to thrive through market turbulence and uncertainty (Highsmith & Cockburn, 2001). More practically, the agile methodology consists of incremental and iterative steps taken within a set of ever-evolving constraints and solutions opportunities. These changes in perspective need a rapid and flexible response mechanism that progressively improves the product and reduces the overall development costs (Beck, Beedle, Van Bennekum, Cockburn, Cunningham, Fowler & Kern, 2001). However, agile development is only possible when searching for a solution to answer a defined and

acknowledged problem that affects a thoroughly defined customer segment. This is rarely the case for many entrepreneurs. Indeed, before being able to think about solutions, entrepreneurs generally struggle to diagnose the problem affecting the customer segment they seek to help (Ries, 2011). Hence, the necessity to integrate the customer development methodology in parallel with agile development to reach quick "solution-problem fit". TLS movement comes as a combination of customer development to first identify a customer segment and a problem worth solving within that segment, with the agile development approach to create a solution that delivers value to customers (Ries, 2011). Combined with business models for their explanatory power in towards value creation strategy (Chesbrough & Rosenbloom, 2002), long-term revenues stream planning (Afuah, Tucci, 2001), and sustainability tactics over time (Zott, Amit & Massa, 2011), TLS becomes a powerful methodology.

The Customer Development method feeds the build-measure-learn cycle with continuous and valuable customer feedback while agile development techniques support the fast and methodical assimilation of validated learning into the loop (Ries, 2011). In addition, TLS management principles leverage the validated learning to create short development cycles, by employing a procedure of continuous improvements that aim at reducing wasteful actions and targeting production performance improvement (Shah et al., 2003). This way, when using TLS approach, startups are able to adapt their product with short and inexpensive iterations that will allow multiple tries given the low burning rate needed to turn the BML loop (Ries, 2011). As a matter of fact, by lowering acquisition costs of new customers, shortening the development cycles and making sure startups are not issuing products customers do not actually want (Maurya, 2012), indirectly startups using TLS methods should result in fewer failures, than startups using traditional methods (Blank, 2013). However, the TLS approach is not as straightforward as just applying some tools, indeed because a business is made up of the result of incremental choices made every day (Collis, 2016), a TLS startup should implement these principles into its core activities (Chase, 1999). "The Lean Startup" movement does not certify success. Indeed, too many factors contribute to the outcome of startups and it isn't one methodology that will guarantee that any single startup will be a winner (Blank, 2013). Furthermore, individually validating each proposition of the business model through hypothesis testing is a reductionist approach: it makes the process more manageable but at a huge cost. The articulation of the business model as a whole is lost because the interactions between each business building block are severed. The impact of a small change in A is wrongfully deemed to have negligible consequences on B. It is advised to keep in mind a holistic perspective of the whole business (Freedman, 1992).

Startup Definition

According to the Cambridge Dictionary, a startup is a small business that has just been started (Start-up Meaning in the Cambridge English Dictionary, n.d.). Although it is true, the essence of the start-up concept is not captured in this characterization. Many have tried to describe what a start-up actually is. For instance, according to Blank, a startup is an organization that searches for a business model which is repeatable and scalable (Blank, 2007). Additionally, Eric Ries holds that a human institution designed to create new products and services under conditions of extreme uncertainty is worthy of being called a startup (Ries, 2011). Furthermore, another key particularity of a startup is its focus towards growth (Miski, 2014). Also, in the DNA of startups, innovation plays a crucial role. However, innovation is not just something new. It also has to prove itself as economically sustainable, technically feasible, in order to give startups a competitive advantage in the market (Brown, 2009). By blending all these virtues, a startup could be described finally as a growth-driven organization designed to create innovative products or services in a sustainable, and scalable fashion in conditions of uncertainty.

Startup Uncertain Environment and Success Factors

Being so vulnerable, startups are subjected to many unpredictable factors that can undermine their fate. In fact, the hypothesis that entrepreneurs with larger and more diverse networks get more support from their network and thus are more successful than entrepreneurs with smaller networks shows the extreme exposure startups have to their environment (Witt, 2004). Interestingly, the use of willing and able allies, the strong motivation for career autonomy and the purposeful use of safety margin have been shown to have a positive impact of the success of startups (Gonzalez, 2017). Moreover, a startup whose founder's motivation comes from dissatisfaction with their current job or from high unemployment rates, instead of identifying an opportunity in the market, has been shown to have less chances of prosperity (Zali, Faghih, Ghotbi & Rajaie, 2013). Additionally, factors like economical contraction or expansion, industry sector development, geographic location, and stimulus from accelerator have been shown not to be significantly related to the success of startups (Gonzalez, 2017). However, economic context has been shown to influence the entrepreneur's perception of the quality of business opportunities, therefore a favourable economic environment could amplify the initial attractiveness of new businesses to entrepreneurs (Devece, Peris-Ortiz & Rueda-Armengot, 2016). Furthermore, not only factors related to a startup's resources like initial financial resources,

industry experience, intellectual property protection, and supply chain integration, but also factors linked to the size of the founding team, and the marketing capabilities of the company has been significantly correlated as determining factors to startups success (Song, Podoynitsyna, Van Der Bij, & Halman, 2008).

A startup's success can be measured as the implementation and execution of the idea, where the founder has moved from idea development and business planning to an actual business startup. This is however, more of a measure of the commitment and implementation abilities of the entrepreneurs than the success of the startup itself. Another broader, more company-related measure, less attached to the founders, and even more objective measure is the persistence in the market given the startups vulnerability. In other words, if a startup still stands it is because in some way it is succeeding. However, the measurement of a startup's success should be adapted to its development stage (Witt, 2004). Additionally, sales values, employment and market share can also be considered as valid measures of success and startup's growth (Gilbert, 2006). Failure is a reality about 75% of all startups will eventually face according to Harvard Business School Professor Shikar Gosh (Blank, 2013).

According to a study conducted in 2017, after the first year in business only 84.2% (global average) of startups survived. Between their second and fifth year, the chance of survival decreased by an average of 10% per year. This means, after five years of struggle, only about 53% of startups were still running (Gonzalez, 2017). Moreover, Fairlie and Miranda (2017) found that only 15.6% of U.S. startups were still alive after seven years of activity. The most common causes of failure have been studied extensively. The main cause for startups death is building a solution looking for problems, and not finding solutions to solve market's need. In fact, a post-mortem study of 101 startups showed that 42% of startups died because product-market fit was not found. This same study concluded that 29% of startups closed doors because they ran out of money. This outcome is often caused by other reasons such as inner team conflicts that erupt in financial stressful situations. Other 23% of startups failed due to not having the right team. Indeed, when the founding team can't deliver MVPs on their own or even by using freelancers for some external help, a startup will eventually fail (CB Insight, 2017). Another factor that can have a big impact on a startups success is timing. Launch it too early and customers will not realize the potential of your innovation, launch it too late and fierce competition is already in place. Timing is everything.

The Lisbon Ecosystem

Timing is right in Lisbon. Lisbon's startup ecosystem has been growing frantically in the last decade. Described as the Silicon Valley of Europe, Portugal entrepreneurial activity has been proliferating over the whole country, especially in Lisbon from which 32.8% of new Portuguese companies derived from in 2016. The remaining entrepreneurial hubs are scattered in central and northern regions of the country, in the littoral area, aligned with the population concentration (Duarte & Grilo, 2016).

Additionally, business incubators and accelerators play a major role in the early stage of the startups' life. They grant essential resources such as physical space, internet access, creative environment, key strategies on business design (business model workshops) and implementation, and share crucial knowledge on management (Salem, 2016). Not only has the number of incubators and accelerators risen to 121 recognised active institutions in national territory (Portugal, 2017) but also, have the co-working spaces and a startup related events namely demo-nights, universities entrepreneurial groups, the biggest startup event in the world WebSummit (Hyde, 2015).

The Portuguese government has been pushing the country towards an entrepreneurial path, according to Pimentel (Pimentel, 2016). The Government sees entrepreneurship as a vehicle to foster growth of the country's wealth. Indeed, high entrepreneurial activity levels correlate with increased innovative activities, economic growth, job creation and market competition (Carree & Thurik, 2003). Thus, António Costa, Portugal's Prime Minister, aims at supporting startups by offering affordable housing, privileged fiscal conditions, outstanding public transportation infrastructure and a talented and highly educated working generation to assist startups' development. Inclusively, the "Startup Visa" was created by the Portuguese Government to promote immigration of foreign entrepreneurs (Pimentel, 2017).

Additionally, an agreement for a new venture between Seedrs, the biggest European equity crowdfunding platform, and StartUp Portugal, a major institution with the objective of investing and supporting the Portuguese ecosystem, has been closed to further reinforce and help the Portuguese ecosystem to thrive (Laranjeiro, 2017).

In the private sector, the Lisbon business angel community is flourishing as business angels invest, at their own risk, their own capital, knowledge and experience, in startups in the beginning of their activity, and also in critical stages of growth or product development (IAPMEI, 2017). Despite this, Lisbon's ecosystem is still recent (Startup Genome, 2017). In addition to external governmental support and private investments' stimulation, the accessibility of incubators and accelerators further encourages startups to be successful, hence, the need for a methodological approach for startup

development such as TLS in order to allegedly increase the startups' chances of achieving favourable outcome (Ries, 2011).

"The Lean Startup" Efficacy

TLS is a new concept in Lisbon. Surprisingly, not many incubators teach it to their startups in the hopes of increasing their chance of success. Even though TLS was created with the goal of increasing the odds of startups' success (Ries, 2011), empirical proof of its benefits is yet to be proven. Recent research has however shown promising results in Italy. In fact, Camuffo and co-authors, ran a random control trial where a startups sample, the treated group, was taught how to identify business model problems, articulate theories, define clear hypotheses, conduct rigorous tests to prove or disapprove them, measure the test, and make decisions based on these tools. Although the control group had some basic training, it was not instructed on how to identify the problems in abstract ways, how to formulate hypotheses, and how to test these hypotheses under rigorous experiments settings using valid and reliable metrics and setting metrics thresholds for decision-making purposes as opposed to the treated group (Camuffo, Cordova & Gambardella, 2017). In other words, the control group was exposed to the basic TLS Startup principles but was not instructed on how to implement them in their startup culture as opposed to the treated team who had extensive implementation training. This study showed that startups not using TLS increased the probability of suffering from confirmation biases. Indeed, using TLS was proven to increase startups' performance because entrepreneurs can better recognize when their projects offer low or high probabilities of return, or when it is profitable to pivot to alternative ideas, therefore reducing the likelihood of suffering from false positives and false negatives when analysing market signals (Camuffo et al., 2017). This way startups can fail inexpensively and thus get more attempts at finding a product-market fit (Ries, 2011). However, TLS tends to attract people who like to be told what they should do next, says Bjoern Lasse Herrmann, CEO of Silicon Valley Compass startup. As Rob Fitzpatrick, CTO at ProductHunt, explained, when entrepreneurs fail to apply critical thinking and strategy to their startup, they will go through the motion of replacing the hard task of strategy with the lazy solution of following someone else's process. Moreover, the Validate Learning principle from TLS is usually overemphasised. In fact, entrepreneurs lose themselves in the validation process of their business model by capturing great quantities of noisy information that would lead to analysis paralysis hence the goal of startups using TLS shouldn't be to validating as many assumptions as possible but instead to validate only the riskiest assumptions (Klinger, 2013). Indeed, when attempting to apply TLS principles, the major

difficulties startups face are a lack of direction, a lack of planning and a lack of adequate project sequencing. Knowing particular tools and techniques is often not the problem (Bhasin & Burcher, 2006).

"The Lean Startup", the hypothesis-driven approach and the scientific method are different names to describe the same managerial philosophy of validation through substantiated research the business assumption of a business model of startups. Despite the great number of experts advocating the use of this philosophy, only Camuffo and co-authors tested empirically its impact on the success of startups. Given the time and budget restraints and the scarcity of empirical work on the impact of TLS principles on a startups chances of success, our research is exploratory. Therefore, a more practical approach will be undertaken to assess the use of TLS principles in the Lisbon's ecosystem and to test whether startups would actually benefit from it.

METHODOLOGY

Initially, this study's purpose was to capture information about the TLS movement impact in the Lisbon's startup community. A broad assessment of movement impact such as consequences on survival/death rates, entrepreneurs' motivation and resilience, startups success and investors' engagement was considered. The scope of the study revealed itself to be too wide, given time and budgetary constraints for data acquisition. Hence, the scope of the study focused on assessing TLS principles' impact on Lisbon's established startups death rates. In other words, to compute and compare startups death rates using TLS and non-TLS principles in Lisbon. In order to determine whether TLS principles have a positive effect on startups' chances of success, both quantitative and qualitative approaches were used.

The decision to use mixed methodology approach is justified by the novelty of such study in the Lisbon ecosystem. Indeed, given Lisbon's ecosystem early age, the lack of infrastructure to run such an experiment raised some initial apprehension since available online databases are outdated and lack critical information about Lisbon's startups. Furthermore, incubators and accelerators don't generally disclose information about their portfolio because of privacy issues. Therefore, in addition to empirical testing through surveys, a qualitative approach was used to generate complementary data. A randomized control trial was not possible due to budgetary limitations and time constraints. Thus, a low-resource macroscopic approach revealed itself as the suitable choice. Although a multi-case startup study approach would be possible, it could not reveal meaningful information about the Lisbon's ecosystem as a whole relative to TLS impact.

Quantitative Approach

Sample

Every participating startup in an acceleration program or coming from a Lisbon incubator, and every entrepreneur also participating in acceleration programs or belonging to a Lisbon incubated startup make up this research universe.

In the interest of this study, an extensive database was built. All the available portfolios of startups incubators and accelerators were used, as well as online databases (f6s, Crunch base, AngelList and Made of Lisboa), to be merged into one single portfolio (for confidentiality reasons the database will not be disclosed, however, online location of available resources are in Appendix –

Table 1. As a consequence of the geographical scope of the study, only incubated or accelerated startups in Lisbon were admitted. Moreover, there wasn't a time frame restriction for admission. No matter what year the startup was founded on, it was accepted as long as it was registered in an incubator or accelerator portfolio established in Lisbon.

After mapping the Lisbon's ecosystem, a total of 1065 startups were compiled. Although the real universe of this study is much broader, all the startups that have risen and fallen without the assistance of an incubator or accelerator were left out.

Randomization

From the compiled portfolio, a statistically representative sample of 283 startups was randomly taken given 95% confidence level and 5% margin of error.

Every startup present in this representative sample was investigated through the internet in order to collect data relative to its status and founders' emails. Once completed, they were asked to fill a short survey distributed through an anonymous email link. The purpose of this survey was to identify which startups had used key TLS principles during their development. The e-mail addresses used to contact these startups were publicly obtained either through the incubators and accelerators' startups portfolio available online, the startup's website, Facebook, databases (Crunchbase, f6s database, AngelList, and Made of Lisboa), and Linkedin. There was however, access to Fábrica de Startup and Beta-i classified databases.

The e-mails were sent with the MailChimp emailing service (https://mailchimp.com/). This service was used because it offered personalised e-mails, mailing list statistics (opening rates of e-mails, opening of embedded link in the e-mail), and is free. Due to low opening rates of emails (average of 24,7%) during the first week, the survey was sent to all available startup contacts (974 contacts) in order to get the representative 283 answers. The survey was active for almost a month (November 30, 2017 to December 23, 2017).

Despite this, and even with cold calling to available startups phone numbers, the total answer rate to the survey was below 10%. In fact, 93 answers were collected, from which only 78 completed the survey, not representing significantly the whole population of Lisbon's established startups.

Timed just under a minute, the purpose of the survey was to identify if startups were alive or dead, when were they founded and through a simple scale, assess if the startups used some key basic concepts described in TLS (Ries, 2011). Sample demographics weren't purposefully collected to reduce survey size and because entrepreneurs' data was out of the study's scope.

The survey asked about startups' name, for identification purposes, startup's foundation year, startup's status (Dead or Alive), followed by four statements to which the inquired would answer through a five-points Likert agreement scale. If a startup answered the survey more than once, only one of the randomly chosen answers was considered.

The IBM SPSS program was used to treat data. An exploratory factorial analysis (EFA) was performed in order to validate the measurement scale of TLS.

This method was essential to evaluate empirically the effect of TLS entrepreneurship on the startups' death rates. For simplicity, the analysis was limited to a binary comparison between startups which implemented the TLS principles on their early development stages and those who didn't. A dummy variable ("Leanness") was created for startup categorization.

Another possible macroscopic methodology was to use statistical data from institutions such as PORDATA and EUROSTAT in order to get Portugal startups' death rates, and assess if their evolution was coincidental with TLS movement adoption in Lisbon. This methodology however, is superficial in the sense that unpredictable external factors could influence results. In fact, given the economic and politic factors which can influence a country's economy and therefore its startup community, it would prove overly difficult to accurately compute usable benchmarks for posterior comparison. Furthermore, such institutions don't possess Lisbon's startup ecosystem specific data needed for the study.

Qualitative data

To understand TLS principles in depth and in the context of incubators and accelerations, semi-structured interviews to incubators directors and accelerator programs managers were conducted. A total of 7 interviews were held. These short interviews were used to grasp information that can be hard to collect only from statistical analysis or surveys, and to get startups leading experts' opinions and insights on the subject. Using semi-structured interviews allowed to collect relevant information but also to give room for some interviewer-interviewee interaction which could result in collection of relevant additional data. Because TLS movement is still young, entrepreneurs might not fully understand its benefits and disadvantages yet, thus not implementing it correctly, hence, the decision to consult with experts in this field.

The interviews were conducted either through internet video-conference Skype service or in the incubators or accelerators offices using a predefined script with open ended questions. Interviewees were asked about TLS movement development in Lisbon, main perceived benefits and disadvantages of TLS philosophy, success and failure factors in the Lisbon's startup community, how is TLS helping native startups, which standard metrics are used to evaluate startups' evolution and finally if the TLS philosophy has any impact on the investors' confidence (Appendix- Script 1). With interviewees' approval, interviews were audio recorder for posterior qualitative analysis using a smartphone. Interviews were schedule through e-mail and timed under thirty minutes.

RESULTS

Scale Validation

First, in order to analyse the collected data, the used scale in the survey needed validation. In fact, the purpose of the survey was to assess if startups used TLS principles. Since these principles aren't always clear, a scale to indirectly measure TLS usage had to be put into place. Four statements were presented in the survey to which the inquired would, within a scale of agreement, share his compliance level. The scale's underlying construct factor is deemed to be the startup's "Leanness". In order to explore this possibility, an exploratory factorial analysis was performed, using principal component extraction method with eigenvalues greater than 1 as the selection criteria. Since the variables were expected to load under one single constructor, an oblique rotation analysis was used. The correlation between each statement is shown in the table below.

Table 1- Correlation and Significance between Scale Variables.

		Testing Legitimacy of Assumptions/Hypothesis	Customer Development Practices	Product Interations	Use of MVPs
Correlation	Testing Legitimacy of Assumptions/Hypothesis	1.000	-	-	-
	Customer Development Practices	.396	1.000	-	-
	Product Interations	.526	.408	1.000	-
	Use of MVPs	.222	.543	.551	1.000
Significance (single tailed)	Testing Legitimacy of Assumptions/Hypothesis	-	-	-	-
	Customer Development Practices	.000	-	-	-
	Product Interations	.000	.000	-	-
	Use of MVPs	.023	.000	.000	-

High correlations levels were found between the four statements' variance with all significance levels under 0.001, except for the correlation between the use of MVPs and testing the legitimacy of the business model assumptions, which was significant at 5%. The sample size was adequate since the sampling adequacy Kaiser-Meyer-Olkin measure (0.617), which measures the variance proportion in variables that might be caused by underlying factors, was greater than 0.05. Furthermore, Bartlett's test of sphericity, which tests the hypothesis of the correlation matrix being an identity matrix (I), was conducted.

Table 2- KMO and Bartlett's Test for Exploratory Factorial Analysis Suitability.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.610
Bartlett's Test of Sphericity	Approx. Chi-Square	90.719
	df	6
	Significance	.000

Since this test significance level was under .001, there is strong evidence supporting variables' correlation and suitability for an exploratory factorial analysis.

The scree plot shows one construct with eigenvalue over one, confirming that all variables load under one single factor.

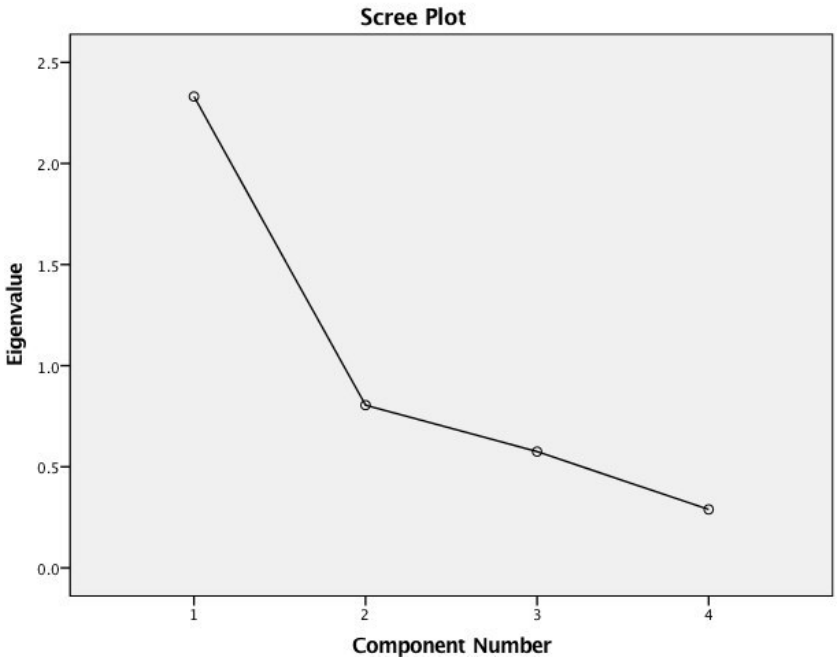

Figure 1- Exploratory Factorial Analysis Scree Plot from SPSS.

The matrix component analysis, which contains correlations loadings between variables and constructs, shows all variables measuring the same factor with strong correlations. In conclusion, scale validation was supported by exploratory factorial analysis.

Table 3- Correlation Factors of Variables under 1 Component.

	Component 1
Testing Legitimacy of Assumptions/Hypothesis	.683
Customer Development Practices	.770
Product Iterations	.824
Use of MVPS	.769

Extraction Method: Principal Component Axis

Sample Characterization

The data collection survey had no demographics inputs. Indeed, demographic data was not considered for this study for two main reasons. Firstly, the survey's purpose was only to collect data on startups' status and measure how TLS they were, and not to collect data on entrepreneurs. This decision kept the survey short and focused only on studying startups.

Given this, only startup sample characterization was possible. In fact, from the 93 startups which started it, 87.1% finished the survey. At the time the survey was active, 86% of startups were still alive. The age of the startups ranged from less than one-month-old to twelve years old.

Table 4- Status Characterization from Sample.

		Frequency	Valid Percent
Valid Answers	Dead	13	14.0%
	Alive	80	86.0%
	Total	100	100.0%

The "Leanness"

The survey scale reflects startups' TLS principles usage, hence it is possible to compare "leanness" with the remaining survey variables.

In order to classify indirectly and quickly startups relative to their TLS usage, four key components of TLS methodology were considered. The first statement (Testing the legitimacy of Assumptions/Hypothesis) tests if the business model was designed relying on validated assumption and hypothesis. The second statement (Customer Development practices) checks if entrepreneurs got "out of the build" to study and learn about their customers. The third statement (Product Iterations) evaluates if startups have iterated their product/service with what was learned from the validation process of the business model. Finally, the last statement (use of MVP) inspects if entrepreneurs used Minimum Viable Products (MVP), early product prototypes, to test key hypothesis of the business model in order to generate "validated learning". The combination of these four statements give a general estimation of whether TLS methodology was used in the startup development.

As a dummy variable, the "Leanness" was computed using the agreement level mean of all four statements. If the mean was greater than 4.01, startups were assumed to be "Lean Startup" (LS) and were attributed a "Leanness" value of 1, in contrast, if the mean was inferior or equal to 4.00, startups

were considered “non-Lean Startup” (NLS) and got a “Leanness” rate of 0. Despite being arbitrarily chosen the 4.01 threshold was considered under one key observation to support this decision. Since the TLS methodology is not just using one or two TLS tools described by Eric Ries, but it is following the principles as business philosophy (Bhasin et al., 2006), only high scoring startups (>4.01) are deemed to be “Lean”. Furthermore, Ries stresses that not being a collection of individual tactics, TLS is a methodology to new product development (Ries, 2011) In fact, the LS classification, is granted when agreement levels are equal or superior to 4 (4- “Somewhat agree” and 5- “Strongly Agree”) in every single statement. This way, 71% of the startups sampled were classified as LS.

Startups’ “Leanness” is attributed according to agreement levels towards four statements, hence a subjective component exists and should be taken into consideration. Furthermore, it is assumed entrepreneurs can both recall in retrospective whether they were conscious about and knew how to implement TLS principles by themselves and, interpret correctly and consistently the survey statements. Indeed, the “Leanness” variable is not a present punctual measure of how TLS a startup is, but instead, it is based on how the startups' business culture relates to the TLS principles over its development history.

Despite being specified to answer the survey as if entrepreneurs were in their early startups' development stages, the question of whether they are biased by recent startups' strategy shifts exists. However, in the scope of this study, it is assumed “Leanness” represents TLS principles usage from early startups’ development stages until its present moment.

The Leanness Evolution

Since TLS principles were first introduced in 2011 with Eric Ries’ book, it is plausible to consider younger startups to have higher likelihood of using them. In order to study this possibility, a simple SPSS correlation between startup’s age and its “Leanness” was run. The results showed no significant direct relationship between the two variables (α>.01).

Table 5- Correlation between Startup's Age and "Leanness".

		Startup's Age	"Leanness"
Startup's Age	Pearson Correlation	1	.165
	Significance (two-tailed)	-	.147
	N	90	79
"Leanness"	Pearson Correlation	.165	1
	Significance (two-tailed)	.147	-
	N	79	81

Another approach was used despite the initial result. Instead of comparing startups' age directly with "Leanness", the startups' percentage using TLS per years of activity was calculated.

Hence, if the startups' percentage using TLS born in 2017 is superior to the startup's percentage of TLS startups born in 2016 and in turn is greater to TLS' percentage born in 2015, and so on and so forth, then time could be linked to the usage levels of TLS principles.

The function presented in the graph (Figure nº2) which represents TLS' percentage over time, isn't monotonously crescent. Therefore, it appears not to exist a clear trend between TLS principles adoption and time. This result was consistent with the previous correlation test.

Given the small dimension of the sample, the result has, however, no statistical significance.

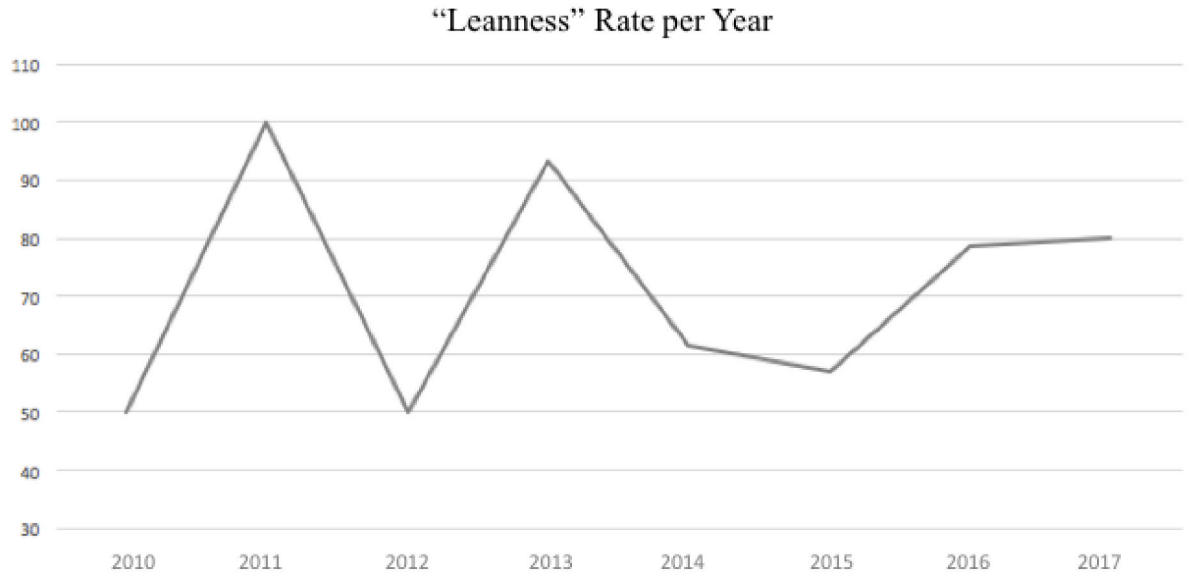

Figure 2- Evolution of "Leanness" rates per Year.

Despite this quantitative outcome, entrepreneurship experts feel that Lean Entrepreneurship is growing in Lisbon's ecosystem. Indeed, the TLS movement has been growing inside incubators and accelerators (G. A. Amorim, personal communication, November 14, 2017; A. Câmara, personal communication, November 17, 2017). Furthermore, Miguel Mira da Silva argues that since TLS was published, accelerators and incubators have been trying to implement those principles for the last five years, and criticizes the lack of studying around this methodology effects on startups (M. M. Silva, personal communication, November 6, 2017).

Death Rates and Leanness

According to the Epidemiology dictionary, mortality rate or death rate could be defined as the quotient between the number of deaths in a given population, divided by the size of that same population (Porta, 2014). In the startup context, startups death rates have an additional time component. Indeed, startups death rates are calculated per year of existence. To compute, for example, the one-year-old startups' death rates, the number of dead startups with one year of existence has not only to be divided by the total number of existing one-year-old startups. Bear in mind, that death rates can be influenced by social, economic, geographic, and political circumstances. Therefore, to accurately compute the one-year-old startups' death rate, the number of one-year-old dead startups created in year X, has to be divided by the total number of startups created in year X in order to avoid circumstantial biases. Hence, the need to create a table as the one below.

It is possible to assess accurately with this table how many startups have perished from their first business year to their second, from their second to their third, and so on. In the first matrix, only LS were considered. In the second matrix, only NLS were examined. These tables allow studying the startups' evolution over time without influence from exogenous factors such as market crisis, political issues, and change in regulations.

Table 6- Death Rates of Lisbon Lean Startups from 2005 to 2017.

		Years of Activity													
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**15**
Establishement Year	**2017**	7	6												
	2016	17	17	16											
	2015	8	8	8	8										
	2014	13	13	13	13	12									
	2013	5	5	5	5	4	4								
	2012	1	1	1	1	1	1	1							
	2011	1	1	1	1	1	1	1	1						
	2010	1	1	1	1	1	1	1	1	1					
	2009	0	0	0	0	0	0	0	0	0	0				
	2008	1	1	1	1	1	1	1	1	1	1	1			
	2007	1	1	1	1	1	1	1	1	1	1	1	1		
	2006	1	1	1	1	1	1	1	1	1	1	1	1	1	
	2005	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 7- Death Rates of Lisbon Non-Lean Startups from 2005 to 2017.

Establishement Year	Years of Activity													
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**15**
2017	2	1												
2016	7	7	5											
2015	8	8	8	7										
2014	1	1	1	1	1									
2013	1	1	1	1	1	1								
2012	0	0	0	0	0	0	0							
2011	1	1	1	1	1	1	1	0						
2010	0	0	0	0	0	0	0	0	0					
2009	0	0	0	0	0	0	0	0	0	0				
2008	0	0	0	0	0	0	0	0	0	0	0			
2007	0	0	0	0	0	0	0	0	0	0	0	0		
2006	0	0	0	0	0	0	0	0	0	0	0	0	0	
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The startups' death rates are computed by making the difference from the number of startups from a year (n) to the following one (n+1), and dividing the result by the number of startups in the initial year (n).

$$\text{Startup Death Rate}_{\text{n}} = \frac{n\text{umber Startups (with n years)} - \text{number Startups (with n} + 1 \text{ years)}}{\text{number of Startups (with n years)}}$$

The startups' death rates derives from the average of all partial startups' death rates computed from the tables above. In order to determine these values, it was assumed that when startups classify themselves as dead, their obituary is December 2017. When startups die, entrepreneurs move on and stop answering e-mails addressed to the former startup's e-mail. Hence, if "dead" startups answer the survey, it is because entrepreneurs, in some way, are still engaged in the startup, therefore the time of death could not have been too long ago. The startups' death rates of this sample haven't been computed because available data isn't statistically significant, hence, results would not be meaningful. Nonetheless, entrepreneurship experts agree on the theoretical value TLS methodology should bring startups, leading to higher chances of success. In fact, from the moment startups are able to get faster and superior conclusions, while using fewer resources, they are already setting themselves up for success (R. Gouveia, personal communication, October 19, 2017). According to António Câmara, Chairman at YGroup, the TLS methodology can give Portuguese entrepreneurs what they usually lack the most: basic management skills. Moreover, it also pressures entrepreneurs to plan in advance,

confront on early stages their business assumptions and set measurable milestones to assess their progress (P. Janela, personal communication, November 16, 2017). Thus, instead of developing business models over gut feeling and intuition, TLS methodology demands validation, and from validation comes the need for iteration (P. Rebordão, personal communication, October 6, 2017).

Additionally, because TLS methodology relies on customer development, it has to be executed with a critical mindset. Firstly, teams should focus on customer segment identification because even the most appealing value proposition will fail if presented to wrong customers (Gouveia, 2017). Secondly, when executing customer development, entrepreneurs should know how to conduct interviews by building biased free surveys in order to produce valid data. Finally, data should be analysed with a critical perspective. Entrepreneurs should interpret the circumstances under which data was collected (Amorim, 2017).

Although the methodology can bring some guidance to new entrepreneurs, it still needs execution and implementation experience to yield positive results (Gouveia, 2017). In fact, because TLS is a process, if hazardous data is feed into the system, negative results will come out of it (Amorim, 2017). Furthermore, following the methodology by the book will put startups under unhealthy tension levels which can hinder entrepreneurs' productivity (Câmara, 2017). Notwithstanding, Isabel Salgueiro, Lisbon Challenge manager at Beta-i, believes Lean entrepreneurship should in theory help entrepreneurs succeed because it brings structure to the startup turbulent environment, but in practice, not only is empirical evidence missing but the substantial importance of the team unity, complementarity and motivation can easily outweigh any existing methodology (I. Salgueiro, personal communication, December 7, 2017).

In agreement, experts identify the main cause of startups' failure in the Portuguese ecosystem as running out of money before achieving product-market fit (when the product satisfies a strong market demand). As a matter of fact, financial stress puts startup's most valuable asset under stress: the team. In this psychological state, conflicts arise, objective misalignments take form, and patience runs out, leaving the startup helpless. Thus, because it is about people, maturity, communication and empathy the TLS principles do not offer support in these situations (Gouveia, 2017). Conflict and friction lead to disenchantment and demotivation of the founding team (Amorim, 2017), hence, a clear startup's early failure signal is when best employees leave (Câmara, 2017).

Furthermore, according to Câmara, the TLS methodology was not made to leverage the Portuguese ecosystem competitive advantage, however as extensive technological knowledge is stored in universities with enormous startup application, TLS methodology could indeed help scientists create new businesses.

Tracking a Startups' Progress

Tracking startups' evolution is not easily done since they are born as quickly as they can disappear. However, entrepreneurs generally leave activity footprints on the internet. Indeed, it is becoming easier and more accessible to produce communication channels such as Facebook pages, landing pages, websites and Linkedin. Maybe because it is too much work to erase the digital trail or just because their emotional attachment to what is left of their company, these cyber trails left behind become helpful to determine startup's status: dead or alive. From the internet, usually no more information is recoverable.

When creating the Lisbon's ecosystem database for this study, many startups were traceable by their name, logotype, Facebook and Linkedin accounts. Despite this, any attempts to contact these startups generally turned out fruitless. In order to monitor startup's growth and progress, Lisbon's entrepreneur experts were asked which key metrics they used.

When asked about standardized measuring systems to monitor startups' progress, the interviewees answered unanimously: it depends. "Every startup is a startup", said Rui Gouveia, CEO of startup studio BuildUp Labs, "for Software-as-a-Service startups, the best key performance indicator (KPI) is definitely monthly recurring income", he added.

Alternatively, experts also stressed straightforward metrics importance such as Customer Acquisition Costs (CAC), Customer Lifetime Value (CLTV) (Janela, 2017), profit margins (Silva, 2017) and external capital invested (Salgueiro, 2017). While revenues might seem as reasonable metric, high revenues startups could be impaired by low-profit margins.

Câmara pointed out more speculative metrics which reflect startups' valuation as a measure of growth such as the future value of the startup (upside), and a startup's future competition risk exposure. However, these metrics are only determinable with startup's internal data, generally not disclosed to the public. Hence, incubators and accelerators ask regularly startups for privilege data in order to oversee their progress (Salgueiro, 2017). But how long takes progress to achieve success? "It depends" was once more the main answer for interviewees. Staying alive is already a metric of success (Gouveia, 2017) but if startups are not growing, they should be classified as failures after three years in business (Rebordão, 2017). In contrast, Gonçalo Amorim estimated five years to be the time span to determine whether startups were successful or not in the technology sector.

“Leanness” and Motivation

TLS is a methodology developed to allegedly increase entrepreneurs’ success probability by offering a structured business validation through experimentation process. This methodology could further influence entrepreneurs’ motivation and resilience towards their projects but using TLS could have contrasting repercussions on entrepreneurs since they are encouraged to think objectively and scientifically. One major problem for new entrepreneurs is their attachment to original ideas. In fact, this affection towards their opinion could impair entrepreneurs to critically and impartially treat data from validation experiments (Salgueiro, 2017). Furthermore, in case of failure, using TLS methodology could help entrepreneurs move on by educating their connection to their project. When asked if TLS could decrease the impact of failure perception on entrepreneurs’ motivation, experts’ majority believed that other factors such as entrepreneur’s personality are significantly more relevant, hence TLS methodology impact on entrepreneurs’ motivation should not be significant (Câmara, 2017; Janela, 2017; Rebordão, 2017; Silva, 2017). In contrast, some experts consider TLS could have some impact on entrepreneurs’ motivation. On one hand, entrepreneurs may feel less affected by failure since a scientific approach was taken and no market validation was found (Amorim, 2017). On the other hand, high success expectations produced by this methodology may result in a more violent confrontation with one’s failure reality (Salgueiro, 2017). Thus both perspectives seem plausible, no data to support either theory was collected.

“Leanness” and Investment

Investment is essential to outset startups. For most entrepreneurs getting funded is the hardest process of building new businesses. According to Isabel Salgueiro, getting pre-seed capital is extremely difficult since entrepreneurs have little to show investors. At this stage, startups are frequently just prototype business models and highly motivated teams. Therefore, in early stages, details do matter. Could TLS startups have higher chances of getting funded? Theoretically, TLS principles should enable entrepreneurs to present more solid proposals to investors thus having better chances of closing a pre-seed investment round. However, when looking for high returns, investors are aware of risks and take decisions based on experience, market opportunity and gut feeling. With no market validation, traction or pre-sales, investors generally rely on the potential and complementarity of the team and their product, not on the methodology used (Câmara, 2017; Janela, 2017; Rebordão, 2017; Silva, 2017). Nevertheless, this methodology could shed a light on the teams’ preparation and resilience (Amorim, 2017), therefore, it would not hurt investors’ confidence (Gouveia, 2017).

DISCUSSION

According to Blank, TLS grants new ventures "the first set of tools for searching new business models" (Blank, 2013). Furthermore, TLS was described as "a set of practices for helping entrepreneurs increase their odds of building a successful startup" (Ries, 2011). With the purpose to empirically support Eric Ries' previous statement, this study objective was to test if LS are more successful than conventional startups in the Lisbon's ecosystem. Researching TLS principles' impact on both entrepreneurs' motivation and resilience, and investors' confidence was also in the study initial scope. In order to collect data, a mixed methodology approach was used. As a qualitative method, a short survey was distributed through an extensive database of Lisbon established startups and, as a quantitative method, short semi-structured interviews were held with entrepreneurship experts.

Even though the literature on TLS methodology was available, its empirical impact on startups' success was scarcely studied. Indeed, only Camuffo and co-authors empirically tested this methodology impact on startups' activity through a randomized control trial. Despite their promising results, TLS principles impact on Lisbon based startups success was not found in this study. Due to insufficient data, any qualitative test performed in this study had no statistical significance. Notwithstanding, no meaningful correlation between startups' status: alive or dead, was established to TLS principles usage. In other words, for our startup sample, TLS principles usage was not statistically linked to higher chances of success. Furthermore, no connection between time and TLS principles' adoption in Lisbon was quantitatively found in contrast to experts' opinions. Moreover, the lack of consensual startup progression metrics and startup's success definition imposed a genuine adversity to this study. Indeed, when no standardized progress measures nor clear success milestones are present, it becomes challenging to survey systematically startups' progress in order to study their behaviour.

Despite these obstacles, a "Leanness" measuring scale initial validation was possible. As a matter of fact, the "Leanness" scale used is the first of its kind and could be further studied and perfected in posterior studies. Not to be extensive neither exhaustive, the scale's purposeful simple design allowed convenient usage and posterior modification. Not being the first scale related to startups, the "Readiness for Investment Level" scale, adapted from the NASA's Technology Readiness Level (TRL) by Steve Blank (Blank, 2014) is a measure of a startups' preparation for investment, comes to shows that startup related scales are helpful.

Insufficient data might have been caused by methodology limitations. Timed under a minute, the low survey response rate could not be explained by its size. Thus, other underlying reasons such as not

receiving the survey, due to spam filters, consciously discard the e-mail by saturation of survey participation, or even a lack of incentive to answer, could better explain this phenomenon. Because entrepreneurs move on after startups collapse and stop answering e-mails sent to their startup's electronic address, the data collection methodology is intrinsically biased since dead startups' probability of answering surveys is lower than alive startups' probability. Furthermore, incubators and accelerators were not able to disclose information about dead startups (i.e. founders' identity), in consequence of absent follow-up protocols, in order to balance sample randomization. Hence, database exploration for qualitative research of TLS impact on startups' death rates turned out unsuitable. Moreover, available databases were found to be outdated and incomplete, hence jeopardizing furthermore this quantitative approach. An initial survey was distributed (Appendix-Script 3) to explore TLS' effect on entrepreneurs' motivation and resilience, and investor's confidence towards investing on LS, but it was quickly interrupted due to size issues (timed at 10 minutes with 28 questions). Afterwards, no more quantitative data relative to entrepreneurs' motivation and resilience and investor's confidence was collected in order to focus exclusively on TLS' effect over Lisbon based startups' death rates.

Understanding what TLS stands for, was another key limitation of this study. Indeed, even experts had some divergent perspectives towards how TLS should actually be implemented and used. In fact, interviewees' majority learned TLS Principles through experience and literature, but not through standardized certified courses such as the Lean Startup Machine (Lean Startup Machine, 2010). Despite being a concept as simple as innovation through repeated, validated experimentation, the execution of TLS is still to be standardized in the Portuguese ecosystem. Because TLS is a methodology bred from other constructs (Frederiksen et al., 2017) such as Customer Development (Blank, 2013) and Agile Development (Shore & Warden, 2008), the simple advertised step-by-step method leads to an intricate implementation process. Therefore, entrepreneurs could perceive they are practising TLS when in fact, they are just using one or two principles, thus not experiencing its alleged benefits. This TLS misconception also exposed another problem in the Lisbon's ecosystem. Indeed, because entrepreneurship in Lisbon is in fashion, many new business owners take advantage of this opportunity to call themselves startups, in order to position in their customers' mind as something more than just small businesses. This behaviour clouds the startup ecosystem causing real startups identification to be a burdensome process.

In order to significantly study TLS' impact on the Lisbon's established startups, a randomized control trial would be the optimal methodology since it overcomes this study methodological limitation, however, it is a costly and time-consuming process.

In order to be more open to such studies and to further enhance the Lisbon's startup ecosystem quality, non-restrictive regulatory measures to standardize fundamental concepts such as "startup" could be useful. For instance, in India and in Switzerland, startups' certification is granted to new businesses that fit startups' business model criteria. These certified businesses would then benefit from tax exemption and special financing conditions. These certifications are not intended to harm ecosystems' growth rate and freedom, but to improve its overall quality.

Indeed, certified startups get special access to networks of potential partners and experts in their industries. Furthermore, certified startups get privilege exposure to potential investors (CTI-Startup, 2017). These certifications would also be valuable for academic reasons since it would generate a vast amount of information. A yearly certification process would allow startup follow-up making them more traceable and researchable.

Given Lisbon's ecosystem early age and infrastructure limitations, the objective to determine whether TLS methodology actually benefits native startups unveiled itself as a daunting task.

CONCLUSION

The following study set out to empirically test if TLS methodology (Ries, 2011) benefits startups by optimizing their chances of success. Macroscopically, the adoption of this methodology should result in decreased startup's death rates. Also, in this study's scope, the methodology impact on entrepreneurs' motivation and resilience when meeting with failure was investigated. Entrepreneurs may feel less affected by failure when a scientific approach is used. However, high success expectations produced by this methodology may also result in a more violent psychological encounter with one's failure. Both of these theories and the main research question stated above remain unanswered. Moreover, adoption rates of TLS methodology could be farther researched.

Mostly due to the lack of answers from the qualitative data collection method, and other fundamental limitations such as startup definition inconsistencies, TLS unregulated usage and irregular understanding, and unstructured environment, no significant trends or behaviours were found in the Lisbon's ecosystem. When faced with the nebulous ecosystem, the methodological limitations of this study where too many to generate conclusions.

The Lisbon ecosystem is growing fast in the eyes of the world as an entrepreneurial hotspot, however, this uncontrolled growth could threaten the system's overall quality. As previously discussed, a startup certification process that classifies small businesses under a conventional startup definition, or even a regular startup census, would benefit the ecosystem by providing initial standards from which knowledge is easier to generate.

Further research is needed on this topic. The "Leanness" scale validity could be further tested and improved, and the methodology optimized to this ecosystem. A randomised control trial or even the compilation of multiple case studies could prove to be superior methodologies. Despite low answering rates of startups, entrepreneurial experts were surprisingly open to interviews, extremely helpful, and interested to share their knowledge about the ecosystem.

Considering that none of the research questions was answered empirically, this study asks for additional investigation. Not only on TLS impact on startups' success, but also on what motivates entrepreneurs to use TLS methodology, how the investor's decision-making process takes place and which factors do they consider when investing in early-stage startups could be interesting to research.

BIBLIOGRAPHIC REFERENCES

- Afuah, A. (2013). Innovation management: strategies, implementation and profits. New York: Oxford University Press.
- Afuah, A., & Tucci, C. L. (2001). Internet business models and strategies (p. 358). New York: McGraw-Hill.
- Amit, R., & Zott, C. (2001). Value creation in e-business. Strategic management journal, 22(6-7), 493-520.
- Anderson, P., & Tushman, M. L. (1990). Technological discontinuities and dominant designs: A cyclical model of technological change. Administrative science quarterly, 604-633.
- Andries, P., Debackere, K., & Looy, B. (2013). Simultaneous experimentation as a learning strategy- Business model development under uncertainty. Strategic Entrepreneurship Journal, 7(4), 288-310.
- Beck, K., Beedle, M., Van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., ... & Kern, J. (2001). Manifesto for agile software development.
- Bhidé, A. (2000). The Origin and Evolution of New Businesses. The Oxford University Press, 54–67.
- Bhasin, S., & Burcher, P. (2006). Lean viewed as a philosophy. Journal of manufacturing technology management, 17(1), 56-72.
- Blank, S. (2007). The Four Steps to the Epiphany – Successful Strategies for Products that Win. Raleigh, NC: Lulu Enterprises.
- Blank, S. (2013). Why the Lean Start-Up Changes Everything. Harvard Business Review, 91(5): 63–72.
- Blank, S. (2014). Steve Blank It's Time to Play Moneyball: The Investment Readiness Level. Retrieved January 02, 2018, from https://steveblank.com/2013/11/25/its-time-to-play-moneyball-the-investment-readiness-level/
- Brown, C. L. (2009). Principles of software development leadership: applying project management principles to agile software development. Cengage Learning.
- CB Insights. (2017). The Top 20 Reasons Startups Fail. Retrieved December 23, 2017, from https://www.cbinsights.com/research/startup-failure-reasons-top/
- Camuffo, A., Cordova, A., & Gambardella, A. (2017). A Scientific Approach to Entrepreneurial Decision-Making: Evidence from a Randomized Control Trial.

- Carree, M. A. and A. R. Thurik (2003). 'The Impact of Entrepreneurship on Economic Growth', in D. B. Audretsch and Z. J. Acs (eds.), Handbook of Entrepreneurship Research, Boston/Dordrecht: Kluwer Academic Publishers, forthcoming).

- Cespedes, F.V., Eisenmann, T. and Blank, S.G. (2012), "Customer discovery and validation for entrepreneurs", Harvard Business School Entrepreneurial Management Case, No. 812-097.

- Chase, N. (1999). Lose the waste: Get lean!. *Quality*, *38*(3), 34.

- Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. Industrial and corporate change, 11(3), 529-555.

- Collis, D. (2016). Lean strategy. Harvard Business Review, 94(3), 62-68.

- CTI-Startup. (2017). Retrieved December 31, 2017, from http://www.ctistartup.ch/faq/cti-start-label/

- Dane, E., & Pratt, M. G. (2007). Exploring intuition and its role in intuition managerial decision making. Academy of Management Review, 32(1), 33–54.

- Devece, C., Peris-Ortiz, M., & Rueda-Armengot, C. (2016). Entrepreneurship during economic crisis- Success factors and paths to failure. Journal of Business Research, 69(11), 5366-5370.

- Duarte, D., Grilo, A., (2016). Portugal Country Report. European Startup Monitor.

- Eisenmann, T. R., Ries, E., & Dillard, S. (2012). Hypothesis-driven entrepreneurship: The lean startup.

- Fairlie, R. W., & Miranda, J. (2017). Taking the leap: The determinants of entrepreneurs hiring their first employee. Journal of Economics & Management Strategy, 26(1), 3-34.

- Frederiksen, D. L., & Brem, A. (2017). How do entrepreneurs think they create value? A scientific reflection of Eric Ries' Lean Startup approach. International Entrepreneurship and Management Journal, 13(1), 169-189.

- Freedman, D. H. (1992). Is management still a science?. Harvard Business Review, 70(6), 26.

- Gehrich, G. (2012). Built it like a startup: Lean Product Innovation. Santa Fe, CA: RSF Publishing.

- Gilbert, R. (2006). Looking for Mr. Schumpeter: Where Are We in the Competition--Innovation Debate?. Innovation policy and the economy, 6, 159-215.

- Gonzalez, G. (2017). What Factors are Causal to Survival of a Startup?. Muma Business Review, 1(9), 97-114.

- Highsmith, J., & Cockburn, A. (2001). Agile software development: The business of innovation. Computer, 34(9), 120-127.

- Hyde, C. (2015). Europe's West Coast: Tech Hub Lisbon Aims to Follow San Francisco. Retrieved December 21, 2017, from https://www.bloomberg.com/news/articles/2015-11-03/europe-s-west-coast-tech-hub-lisbon-aims-to-follow-san-francisco

- IAPMEI, (2017). StartUp Portugal Presentation. Retrieved December 21, 2017, from https://www.iapmei.pt/getattachment/PRODUTOS-E-SERVICOS/Empreendedorismo-Inovacao/Empreendedorismo/Apoios-e-Incentivos/Startup-Portugal/Briefing-PM-sobre-Startup-Portugal-(3).pdf.aspx

- Klinger, A. (2013). Why Lean Startup sucks for startups. Retrieved December 19, 2017, from http://klinger.io/post/69794653694/why-lean-startup-sucks-for-startups

- Krafcik, J. F. (1988). Triumph of the lean production system. MIT Sloan Management Review, 30(1), 41.

- Laranjeiro, A. (2017). Seedrs e Portugal Ventures firmam parceria para aumentar investimento em start-ups. Retrieved December 21, 2017, from http://www.jornaldenegocios.pt/empresas/pme/start-ups/detalhe/seedrs-e-portugal-ventures-firmam-parceria-para-aumentar-investimento-em-start-ups

- Lean Startup Machine (2010). Retrieved December 31, 2017, from https://www.leanstartupmachine.com/

- Magretta, J. (2002). Why Business Models Matter, 3–8.

- Maurya, A. (2012). Running lean: iterate from plan A to a plan that works. " O'Reilly Media, Inc.".

- Mazzarol, T. (2001). Small Enterprise Research Do Formal Business Plans Really Matter? – An Exploratory Study of Small Business Owners in Australia Do Formal Business Plans Really Matter? -An Exploratory Study of Small Business Owners in Australia. Small Enterprise Research, 9(1), 32–45.

- Miski, A. (2014). Development of a mobile application using the lean startup methodology. International Journal of Scientific & Engineering Research, 5(1), 1743-1748.

- Müller, R. M., & Thoring, K. (2012). Design thinking vs. lean startup- A comparison of two user-driven innovation strategies. Leading Through Design, 151. ISO 690.

- Osterwalder, A., Pigneur, Y., Smith, A., & Movement, T. (2010). You're holding a handbook for visionaries, game changers, and challengers striving to defy outmoded business models and design tomorrow's enterprises.

- Osterwalder, A., Pigneur, Y., & Tucci, C. L. (2005). Clarifying business models: origins, present, and future of the concept. Communications of the Association for Information Systems, 15(1), 1–43.

- Pimentel, A. (2016). António Costa quer que Portugal seja "o país mais amigo do empreendedorismo" da Europa. [online] Observador. Available at: http://observador.pt/2016/06/06/antonio-costa-quer-que-portugal-seja-o-pais-mais-amigo-do-empreendedorismo-na-europa/ [Accessed 18 December 2017]

- Pimentel, Agência Lusa (2017). Costa anuncia "Startup Visa" para jovens empreendedores indianos. Retrieved December 21, 2017, from http://observador.pt/2017/01/09/costa-anuncia-vistos-startup-para-jovens-empreendedores-indianos/

- Perry, S. C. (2001). The Relationship between Written Business Plans and the Failure of Small Businesses in the U.S. Journal of Small Business Management, 39(3), 201–208. https://doi.org/10.1111/1540-627X.00019

- Porta, M, ed. (2014). "Death rate". A Dictionary of Epidemiology (5th ed.). Oxford: Oxford University Press. p. 69.

- Portugal, S., & Factory, D. (2017). Startup Portugal Infonograph (Rep.). Lisbon. doi:https://static1.squarespace.com/static/56d6c3b42b8ddec113c63567/t/5968ae811b631b9ee5214d31/1500032642080/SUP20162017.pdf

- Porter M. E.; (1985). Competitive Advantage: Creating and Sustaining Superior Performance. Free Press: New York

- Ries, E. (2011). The Lean Startup at Google Talks [Youtube]. Retrieved December 21, 2017, from https://www.youtube.com/watch?v=fEvKo90qBns&t=1708s

- Ries, E. (2014). The lean startup: how todays entrepreneurs use continuous innovation to create radically successful businesses. New York: Crown Business.

- Sahlman, W. A. (1997). How to Write a Great Business Plan How to Write a Great Business Plan? Harvard Business Review.

- Salem, M. (2016). The Role Of Business Incubators In The Economic Development Of Saudi Arabia. [online] Cluteinstitute.com. Available at: http://cluteinstitute.com/ojs/index.php/IBER/article/viewFile/8694/8680 [Accessed 31 December 2017].

- Shah, R., & Ward, P. T. (2003). Lean manufacturing: context, practice bundles, and performance. Journal of operations management, 21(2), 129-149.

- Shore, J., & Warden, S. (2008). The art of agile development. Sebastopol: O'Reilly Media.

- Song, M., Podoynitsyna, K., Van Der Bij, H., & Halman, J. I. (2008). Success factors in new ventures: A meta-analysis. Journal of product innovation management, 25(1), 7-27.

- Startup Meaning in the Cambridge English Dictionary. (n.d.). Retrieved December 14, 2017, from https://dictionary.cambridge.org/dictionary/english/start-up?fallbackFrom=english

- Startup Genome, S. (2017). Startup Ecosystem Report 2017.pdf

- Trimi, S., & Berbegal-Mirabent, J. (2012). Business model innovation in entrepreneurship. International Entrepreneurship and Management Journal, 8(4), 449-465.

- Tzu, S. (2017). The art of war. Knickerbocker Classics.

- Witt, P. (2004). Entrepreneurs' networks and the success of start-ups. Entrepreneurship & Regional Development, 16(5), 391-412.

- Womack, J. P., & Jones, D. T. (1996). Lean thinking—banish waste and create wealth in your corporation. *Journal of the Operational Research Society*, *48*(11), 1148-1148.

- Womack, J. P., & Jones, D. T. (2003). Lean thinking: Revised and updated.

- Zali, M. R., Faghih, N., Ghotbi, S., & Rajaie, S. (2013). The effect of necessity and opportunity driven entrepreneurship on business growth. International Research Journal of Applied and Basic Sciences, 7(2), 100-108.

- Zott, C., Amit, R., & Massa, L. (2011). The business model: recent developments and future research. Journal of management, 37(4), 1019-1042.

APPENDIX

Table 8- Online Location of Incubators/Accelerators' Portfolios and Online Databases, and Accessibility. (Last checked on 31-12-2017)

Accelerator/Incubator	Porfolio Online Location	Accessibility
Beta-i	-	Restricted Access
Bright Pixel	https://brpx.com/incubation/	Public
Building Global Innovators	http://www.bgi.pt/#/portfolio	Public
BuildUp Labs	http://builduplabs.com/#work	Public
DNA Cascais	http://www.dnacascais.pt/empresas-dna-cascais/	Public
EDP Starter	https://www.edpstarter.com/#incubation	Public
EggNest	http://www.eggnest.org/companies	Public
Fábrica de Startups	http://www.fabricadestartups.co/startups/	Public + Restricted Access
INOVISA	http://inovisa.pt/#empresas	Public
Labs Lisboa	http://labslisboa.pt/labs-lisboa/	Public
Madan Parque	http://madanparque.loudzap.com/empresas/	Public
Startup Lisboa	http://www.startuplisboa.com/search-startups-index/	Public
Startup Sintra	http://www.startupsintra.com/pt-pt/#	Public
Tagus Park Incubator	http://www.taguspark.pt/incubadora/	Public
Tech Labs	http://teclabs.pt/empresas-incubadas/	Public
Vodafone Power Labs	http://powerlab.vodafone.pt/	Public
Online Database		
AngelList	https://angel.co/	Public
Crunchbase	https://www.crunchbase.com	Public
f6s	https://www.f6s.com/startups	Public
Made Of Lisboa	https://madeoflisboa.com/directory?t[]=2	Public

Script 1- Semi-Structured Interview Question Script. Interviews were conducted in Portuguese.

"The Lean Startup":
-How familiarised are you with the Lean Startup Approach?
-What are according to you the main benefits of using Lean tools for startup development?
-What are according to you the disadvantages of using Lean tools for startup development?
-What is your opinion on the following statement: "Because Lean Entrepreneurship uses empirical testing over rhetorical reasoning, if the startup venture is unsuccessful under this methodology, the entrepreneurs' confidence and motivation is less affected."
-To the extend of your knowledge, how is Lean startup evolving in Portuguese' startups incubators?

Success/Mortality Rates:
-In your opinion, which are the most common causes of startup failure?
-How can Lean avoid the most common startup failures?
-In your opinion, how can the Lean Entrepreneurship Methodology improve the chances of success of new startup (ie. influence success or mortality rates)

What about Startup Growth Measurements:
-How do you measure and keep track of a startup growth and evolution (cashflow and sales, customer number, "likes on facebook", number of employees, number of orders per unit of time)? Alternative Which are the key metrics to measure startup growth and development?
-In your opinion, after how much time of existence can you generally determine wether a startup is a success or a failure as a startup?
-Which are the first clear early signs of the startup failure?
-**EXTRA** [Is there a standardised measurement to track a startup's growth?]

Early stage/ Pre-Seed investments:
-EXTRA [Have you ever invested financially on a Startup?]
-How can Lean Entrepreneurship have an effect on the investor's confidence regarding new startups investment opportunities?
-If a startup was participating on a lean acceleration program, how more willing would you be to invest in it opposed to regular product-centric acceleration programs?

Script 2- Online "Leanness" Survey from Qualtrics used for data collection.

Start of Block: Introduction

Q1 The sole purpose of this survey is to understand if Lean Principles were used when developing your startup business model.
This is a research project being conducted for a Master's thesis at Católica Lisbon School of Business and Economics.
Your participation in this survey is voluntary and will take approximately 1 minute of your time.
If you have any question about the research project, please contact Martim Caldeira.

Martim Caldeira
152116215@alunos.lisboa.ucp.pt
martimcaldeira94@gmail.com

End of Block: Introduction

Start of Block: Which Startup?

Q4 Enter your startup name:

_____

Q5 When was your startup founded (MM/YYYY)?

_____

Q6 What is the current status of your startup?

- ○ Dead (1)
- ○ Alive (2)

End of Block: Which Startup

Start of Block: Questions

Q2 To what extend do you agree with the following statements: "When developing my startup..."

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I have tested the legitimacy of my business assumptions/hypothesis. (1)	○	○	○	○	○
I have engaged in some way with customers in order to understand their problems. (2)	○	○	○	○	○
I have iterated my product/service with what was learned from the validation process of the business model. (3)	○	○	○	○	○
I have used a Minimum Viable Product (MVP) to test some key hypothesis of the business model. (4)	○	○	○	○	○

End of Block: Questions

Script 3- Interrupted Online Survey from Qualtrics used for initial data collection.

Start of Block: Introduction Block

Q1 The purpose of this research project is to compare entrepreneurs' levels of satisfaction when enrolled in startup acceleration programs following the traditional product-centered approach against the lean entrepreneurship methodology.

This is a research project being conducted for a Master's thesis project at Católica Lisbon School of Business and Economics.

Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time.

The participation involves filling this survey that will take approximately 10 minutes of your time. Your responses will be confidential and will not be disclosed to third parties. Identifiable information will not be collected. The collected data will not be individually analysed but will be instead studied as a whole.

If you have any questions about the research study, please contact Martim Caldeira at Católica Lisbon School of Business and Economics.

Martim Caldeira
152116215@alunos.lisboa.ucp.pt
martimcaldeira94@gmail.com

End of Block: Introduction Block

Start of Block: Startup Topic I Block

*

Q2 In the startup ecosystem, where do you position yourself?

- ☐ Entrepreneur (1)
- ☐ Investor (2)
- ☐ Advisor/Mentor (3)
- ☐ Not in this ecosystem (4)
- ☐ Other (5) _____

Q3 Have you ever participated in startups' acceleration programs?

No (1)

1-2 programs (2)

3-4 programs (3)

More than 4 programs (4)

Skip To: End of Block If Have you ever participated in startups' acceleration programs? = No

Q4 In which sectors of activity are the startups you've worked on positioned?

- [ ] Accounting (1)
- [ ] Banking (2)
- [ ] Construction (3)
- [ ] Consulting (4)
- [ ] Education (5)
- [ ] Entertainment (6)
- [ ] Financial Services (7)
- [ ] Food Processing (8)
- [ ] Other: (9) _____
- [ ] Government (10)
- [ ] Healthcare/Hospital (11)
- [ ] Hospitality and Tourism (12)
- [ ] Information (13)
- [ ] Insurance (14)
- [ ] Legal Services (15)
- [ ] Manufacturing Industry (16)
- [ ] Mass Media (17)
- [ ] Pharmaceuticals (18)
- [ ] Public Health (19)
- [ ] Real State (20)

- [ ] Retail Services (21)
- [ ] Technology (22)
- [ ] Telecommunications (23)
- [ ] Transportation (24)
- [ ] Franchising (25)

Page Break

Q5 **Lean entrepreneurship** is a methodology that relies on recursive modifications of the business model. This method takes advantage of customer feedback in parallel with the product development to validate underlying hypothesis of the business model. This procedure ensures the efficient use of resources not only to build a product that customers actually want but also not to pursue an unprofitable business venture. Given this:

Q7 How familiarized are you with the Lean Entrepreneurship methodology regarding startup acceleration programs or management practices?

- Not familiar at all (1)
- Slightly familiar (2)
- Moderately familiar (3)
- Very familiar (4)
- Extremely familiar (5)

End of Block: Startup Topic I Block

Start of Block: Demographics Bloc

Q34 What is your age?

- 15-24 years old (1)
- 25-34 years old (2)
- 35-44 years old (3)
- 45-54 years old (4)
- 55-64 years old (5)
- +65 years old (6)

Q35 What is your gender?

- Male (1)
- Female (2)

Q36 What is the highest degree or level of education you have completed?

Less than high school (1)

High school graduate (2)

Professional degree (3)

Bachelor's/Undergraduate degree (4)

Master's degree (5)

Doctorate (6)

Other: (7) _____

Q37 What is your current occupation?

- [ ] Employed full time (1)
- [ ] Employed part time (2)
- [ ] Unemployed looking for work (3)
- [ ] Unemployed not looking for work (4)
- [ ] Retired (5)
- [ ] Student (6)
- [ ] Disabled (7)

Q38 In which field of education did you study?

- ☐ Exact Sciences or Engineering (1)
- ☐ Economics or Finance (2)
- ☐ Management or Administration (3)
- ☐ Marketing or Public Relations and Communication (4)
- ☐ Literary Sciences (5)
- ☐ Other: (6) _____

End of Block: Demographics Bloc

Start of Block: Startup Topic I Block NO Lean

Q40 Have you ever participated on a startup acceleration program **not using** the lean entrepreneurship methodology or similar?

- Never (1)
- Once (2)
- Twice (3)
- Three or more times (4)

Skip To: End of Block If Have you ever participated on a startup acceleration program not using the lean entrepreneurship... = Never

Page Break

Q16 Going back to the time where you have participated on startup's acceleration programs **NOT using** the lean entrepreneurship methodology or similar.

Q12 How satisfied were you with:

	Extremely satisfied (1)	Somewhat satisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat dissatisfied (4)	Extremely dissatisfied (5)
Your ability to complete daily tasks. (1)					
Your ability to meet deadlines. (2)					
The working space atmosphere. (3)					
Your relationship towards your team members. (4)					

Q17 To what extend do you agree with the following statements:

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
I often spent extra effort in carrying out my job. (1)					
I volunteered to do things for my work group. (2)					
I usually felt excited in the morning to go to work. (3)					
I was doing meaningful and fulfilling work. (4)					

Q18 And how satisfied were you with:

	Extremely satisfied (1)	Somewhat satisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat dissatisfied (4)	Extremely dissatisfied (5)
Your general health. (1)					
Your eating habits. (2)					
Your hours of sleep. (3)					
Your free time. (4)					
Your physical activity level. (5)					

End of Block: Startup Topic I Block NO Lean

Start of Block: Startup Topic I Block YES Lean

Q8 Have you ever participated on a startup acceleration program **using** the lean entrepreneurship methodology or similar?

- Never (1)
- Once (2)
- Twice (3)
- Three or more times (4)

Skip To: End of Block If Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Never

Page Break

Q22 Going back to the time where you have participated on startup's acceleration programs using the lean entrepreneurship methodology or similar.

Q14 How satisfied were you with:

	Extremely satisfied (1)	Somewhat satisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat dissatisfied (4)	Extremely dissatisfied (5)
Your ability to complete daily tasks. (1)					
Your ability to meet deadlines. (2)					
The working space atmosphere. (3)					
Your relationship towards your team members. (4)					

Q20 To what extend do you agree with the following statements:

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
I often spent extra effort in carrying out my job. (1)					
I volunteered to do things for my work group. (2)					
I usually felt excited in the morning to go to work. (3)					
I was doing meaningful and fulfilling work. (4)					

Q23 And how satisfied were you with:

	Extremely satisfied (1)	Somewhat satisfied (2)	Neither satisfied nor dissatisfied (3)	Somewhat dissatisfied (4)	Extremely dissatisfied (5)
Your general health. (1)					
Your eating habits. (2)					
Your hours of sleep. (3)					
Your free time. (4)					
Your physical activity level. (5)					

End of Block: Startup Topic I Block YES Lean

Start of Block: Investor Topic Bloc

Q30 As an investor, would you feel more confident to invest on Startups using the Lean Entrepreneurship Methodology on Acceleration Programs?

- Definitely not (1)
- Probably not (2)
- Might or might not (3)
- Probably yes (4)
- Definitely yes (5)

Q31 **As an investor**, which benefits do you think Lean Entrepreneurship has over the classic product-centric approach?

_____

_____

_____

_____

_____

Q32 **As an investor,** which are the downsides of the Lean Entrepreneurship methodology?

_____

_____

_____

_____

_____

End of Block: Investor Topic Bloc

Start of Block: Startup Topic I Closing Block

Display This Question:

If Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Once

Or Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Twice

Or Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Three or more times

Q26 In your opinion, do you think startups would benefit from the Lean Entrepreneurship approach?

- Extremely likely (1)
- Somewhat likely (2)
- Neither likely nor unlikely (3)
- Somewhat unlikely (4)
- Extremely unlikely (5)

Display This Question:

If Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Once

Or Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Twice

Or Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Three or more times

Q27 In your opinion, which benefits could a startup have when using the Lean Entrepreneurship methodology?

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Display This Question:

If Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Once

Or Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Twice

Or Have you ever participated on a startup acceleration program using the lean entrepreneurship meth... = Three or more times

Q36 In your opinion, what are the downsides of the Lean Entrepreneurship methodology?

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